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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/849,053	05/20/2004	Masahiro Ogawa	60188-865	6747

7590

03/21/2006

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EXAMINER
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MONDT, JOHANNES P

ART UNIT	PAPER NUMBER
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3663

DATE MAILED: 03/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/849,053	<b>Applicant(s)</b> OGAWA, MASAHIRO	
	<b>Examiner</b> Johannes P. Mondt	<b>Art Unit</b> 3663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 03 January 2006.  
 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.  
 4a) Of the above claim(s) 3-13 is/are withdrawn from consideration.  
 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
 6) ☒ Claim(s) 1 and 2 is/are rejected.  
 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) ☒ All b) ☐ Some \* c) ☐ None of:  
 1. ☒ Certified copies of the priority documents have been received.  
 2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Response to Amendment*

Amendment filed 1/3/06 forms the basis for this office action. In said Amendment applicant substantially amended claims 1-5 through substantial amendment of both independent claims 1 and 2. Claims 1 and 2 have previously been elected.

Examiner thanks applicant for submitting a certified translation into English of IDS item JP 2001-345478.

Comments on Remarks submitted with said Amendment are included below under "Response to Arguments".

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. **Claims 1-2** are rejected under 35 U.S.C. 102(b) as being anticipated by Sakai

(JP 2001-345478 A) (IDS item, as made of record as certified English translation, by applicant upon request of examiner) (foreign priority of Sakai as cited before).

*Sakai teaches* a semiconductor device (title, abstract, Figures 1-4 and pp. 1-7) comprising an active layer 16 (16 is the active layer because when a voltage is applied to the light emitting element having a three-layered structure 12/16/18 light is emitted while said light inherently is emitted from recombination of electrons and holes accelerated in opposite directions by means of said voltage, which recombination

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mainly takes place in the undoped region between n-doped and p-doped layers 12 and 18, i.e., in the light emitting layer 16; see page 1, "Means for Attaining the object") constituted by a Group III nitride semiconductor layer 16 (loc.cit.) containing at least three different elements including at least aluminum (namely: AlGaN) (loc.cit.), wherein the active layer exhibits a fluctuation in the bandgap based on a variation in the distribution of the aluminum content )loc.cit.) in the active layer on the order of nanometers containing an excessive amount of Al in the active layer (note that Sakai not only teaches Ga droplets but, alternatively, also Al droplets (see inter alia "Means for Attaining the Object", page 1), and that the spatial scale is of the order of nanometers because the size of the Al droplets can be as small as approximately 10 nanometers (see page 4, "Embodiment of the Invention"), which determines the spatial scale of the Al content fluctuation; see col. 4, lines 1-7, for the alternative embodiment using Al droplets, and see page 4, fourth paragraph, on the spatial scale of the droplets (10 – 500 nm)).

Furthermore, the application falls short of distinguishing over Sakai on the limitation of the spatial scale of the fluctuations because the specification only describes a process whereby a fluctuation scale "of the order of nanometers" (see page 9) is achieved through the creation of a plume 18 ejected from the target created by irradiating half of target 17, said plume reacting with nitrogen gas in the atmosphere thus creating an excessive amount of  $\text{AlN}_x$ . However, the scale of gaseous chemical reactions necessarily is in excess of the order of the mean free path in the atmospheric gas (see, e.g., Chapman and Cowling, "The Mathematical Theory of Non-Uniform

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Gases", Cambridge University Press, Cambridge, UK (1970), pages 88-89) (N.B.: in excess because not every collision leads to a chemical reaction, although a collision is necessary for a chemical reaction) which is much longer than just a few nanometers (see Chapman and Cowling, loc.cit., page 89), being at standard temperature and pressure ("STP") of the order of  $10^{-5}$  cm = 100 nm; while all other dimensions indicated in the specification are greater than about 10 nm. Therefore, the specification does not disclose spatial scales of any structure, let alone the fluctuation of the Al content in the active layer to be of a spatial scale that is smaller than as described by Sakai.

*On claim 2:* The device of claim 22 would necessarily have to be formed in order to function. Claim 2 fails to further limit the device of claim 1 other than at most simply form each of its components.

### ***Response to Arguments***

Applicant's arguments filed 1/3/06 have been fully considered but they are not persuasive. Counter to applicant's statement that the feature defined by the newly added limitation that the variation of Al content is "on the order of nanometers containing an excessive amount of Al", column 3, lines 35-51 and column 4, lines 1-7 convince otherwise: Sakai clearly teaches an alternative embodiment wherein Al droplets are used instead of Ga droplets, in other words: the active layer exhibits excess of Al in said regions where in the first embodiment Ga droplets are present, while the

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newly added limitation on the scale of the fluctuations, namely “on the order of nanometers” is at best inadequate to distinguish over the prior art because variations caused by droplets of 10 nm – 500 nm as recited by Sakai (column 3, lines 35-40) impart variations in the distribution of aluminum content of the order of nanometers: most certainly 10 nm or even 20 or 30 nm meets the claim limitation “on the order of nanometers”.

Furthermore, the application falls short of distinguishing over Sakai on the limitation of the spatial scale of the fluctuations because the specification only describes a process whereby a fluctuation scale “of the order of nanometers” (see page 9) is achieved through the creation of a plume 18 ejected from the target created by irradiating half of target 17, said plume reacting with nitrogen gas in the atmosphere thus creating an excessive amount of  $\text{AlN}_x$ . However, the scale of gaseous chemical reactions necessarily is in excess of the order of the mean free path in the atmospheric gas (see, e.g., Chapman and Cowling, “The Mathematical Theory of Non-Uniform Gases”, Cambridge University Press, Cambridge, UK (1970), pages 88-89) (N.B.: in excess because not every collision leads to a chemical reaction, although a collision is necessary for a chemical reaction) which is much longer than just a few nanometers (see Chapman and Cowling, loc.cit., page 89), being at standard temperature and pressure (“STP”) of the order of  $10^{-5}$  cm = 100 nm; while all other dimensions indicated in the specification are greater than about 10 nm. Therefore, the specification does not disclose spatial scales of any structure, let alone the fluctuation of the Al content in the active layer to be of a spatial scale that is smaller than as described by Sakai.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Johannes P. Mondt whose telephone number is 571-272-1919. The examiner can normally be reached on 8:00 - 18:00.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack W. Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JPM

March 15, 2006

  
JACK KEITH  
SUPERVISORY PATENT EXAMINER